(NEP)

B.Sc. III Semester Degree Examination, February/March - 2023

MATHEMATICS

Ordinary Differential Equations and Real Analysis - I

Time : 3 Hours

Maximum Marks : 60

Instructions to Candidates :

1. Part : A - **All** questions are compulsory.
2. Part : B - Answer any **five** full questions.

PART-A

I. Answer the following questions. (5×2=10)

a. Solve $(4x+3y+1)dx+(3x+2y+1)dy=0$.

b. Solve $(p-xy)(p-x^2)(p-y^2)=0$.

c. Evaluate $\frac{1}{D^2+a^2}\cos ax$.

d. Discuss the convergence of the sequence $\cos^2 n\pi$.

e. Define convergent and divergent of the series.

PART - B

Answer any **five** full questions. (5×10=50)

II. a. Solve $\left(\sin x\cos y+e^{2x}\right)dx+(\cos x\sin y+\tan y)dy=0$.

b. Solve $x^2p^2+xyp-2y^2=0$.

III. a. Solve $x^2ydx-(x^3+y^3)dy=0$.

b. Solve $y=x+2\tan^{-1}P$.

IV. a. Solve $4\frac{d^2y}{dx^2}+4\frac{dy}{dx}-3y=e^{2x}$.

b. Solve by method of variation of parameter $\frac{d^2y}{dx^2}+y=\sec x$.

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V. a. Solve $\left(D^2+3D+2\right)y=e^{2x}\sin x$.

b. Verify the condition for integrability $zdx+zdy+[2(x+y)+\sin z]dz=0$.

VI. a. Prove that the sequence $\left\{\frac{2n+7}{3n+2}\right\}$.

i. is monotonically increasing.

ii. is bounded.

iii. Tends to limit 2/3.

b. Discuss the convergence of the following sequence.

i. $1+\frac{1}{3}+\frac{1}{3^2}+.....+\frac{1}{3^n}$.

ii. $\frac{n}{n^2+1}$.

VII. a. Find the limit of the sequence 0.7,0.77,0.777,..........

b. State and prove D'Alembert's ratio test.

VIII. a. Discuss the convergence of the series $\frac{x}{2\sqrt{1}}+\frac{x^3}{3\sqrt{2}}+\frac{x^5}{4\sqrt{3}}+.....\infty$.

b. Discuss the convergence of the series

i. $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+.....+0\infty$.

ii. Prove that every absolutely convergent series is convergent.

27323

B.Sc. III Semester Degree Examination, February/March 2022
Paper – 3 : MATHEMATICS – III (New)

Time : 3 Hours   Max. Marks : 80

Instructions : *1)* ***Part – A : All*** *questions are* ***compulsory****.*
2) ***Part – B*** *: Solve* ***any five*** *questions from* ***seven*** *questions.*
3) Write the question ***number*** *correctly.*

PART – A

Answer the following questions. **(10×2=20)**

I. 1) Define infimum and supremum of the sequence.

2) Test the convergence of the series $\sum \tan \frac{1}{n}$.

3) State Cauchy's Root test.

4) If a series $\sum u_n$ is convergent, then prove that $\lim_{n\to\infty} u_n = 0$.

5) Test the convergence or divergence of the series $\frac{1}{1.4}+\frac{1}{2.5}+\frac{1}{3.6}+....+\infty$.

6) Find the angle between the radius vector and the tangent for the curve $r = a\,(1-\cos\theta)$.

7) For the cardioid $r = a\,(1-\cos\theta)$, show that $2ap^2 = r^3$.

8) Find the length of polar subtangent and polar subnormal at the point $\theta = \frac{\pi}{6}$ for the curve $r = a\cos 2\theta$.

9) Evaluate $\int \sec^n x\, dx$.

10) Evaluate $\int_0^{\pi/2} \sin^4 x \cos^2 x\, dx$.

PART – B

Answer **any five** complete questions. **(5×12=60)**

II. 11) State and prove limit form of comparision test.

12) Discuss the convergence of the series $\frac{1}{1.2.3}+\frac{3}{2.3.4}+\frac{5}{3.4.5}+....$

P.T.O.

III. 13) State D'Alembert's test and test the convergence of the series $\sum \frac{2^{n-1}}{3^n + 1}$.

14) Sum the series by C+is method $\cos\alpha + \cos(\alpha+\beta) + \cos(\alpha+2\beta) + ... +$ to n terms.

IV. 15) Find the angle between the curves at their point of intersection $r = a(1 - \cos\theta)$, $r = 2a\cos\theta$.

16) Show that the following pairs of curves intersect orthogonally $r^n = a^n \cos n\theta$, $r^n = b^n \sin n\theta$.

V. 17) Derive the length of perpendicular from the pole to the tangent at a point to the curve.

18) Show that for the curve $r^2 = a^2 \sec 2\theta$, the length of the perpendicular from the pole to tangent is $a\sqrt{\cos 2\theta}$.

VI. 19) Find the Pedal equation of the curve $r^2 = a^2 \cos 2\theta$.

20) Show that the curve $r^2 = a^2 \cos 2\theta$ and $r = a(1+\cos\theta)$ intersect at an angle $3\sin^{-1}\left(\frac{3}{4}\right)^{1/4}$.

VII. 21) Find the reduction formula for $\int_0^{\pi/2} \cos^n x \, dx$.

22) Evaluate :

i) $\int_0^{\pi} x \sin^4 \theta \cos^6 \theta d\theta$

ii) Show that $\int_0^{\pi/2} \sin^4 x \cos^2 x dx = \frac{\pi}{32}$.

VIII. 23) Evaluate :

i) $\int_0^4 x^3 \sqrt{4x - x^2} dx$

ii) $\int_{\pi/4}^{\pi/2} \cot^5 x dx$.

24) Evaluate $\int_0^{\pi/2} \frac{dx}{(a^2 \cos^2 x + b^2 \sin^2 x)^2}$ using Leibnitz's rule of differentiation under integral sign.

B.Sc. III Semester Degree Examination, February/March 2022
MATHEMATICS
Paper – 3.1 : Vector Algebra and Solid Geometry (Old)

Time : 3 Hours Max. Marks : 60

Instructions : *1) Answer **all** Sections.*
*2) Write the question number **correctly**.*

SECTION – A

I. Answer **any ten** of the following : **(10×2=20)**

1) Find the unit vector coplanar with $\vec{a}$ and $\vec{b}$ and perpendicular to $\vec{c}$ where $\vec{a} = 2i - j + k$, $\vec{b} = i + 2j - k$ and $\vec{c} = 2i + 3j$.

2) Show that $\vec{a} \times \left(\vec{b} \times \vec{c}\right) + \vec{b} \times \left(\vec{c} \times \vec{a}\right) + \vec{c} \times \left(\vec{a} \times \vec{b}\right) = 0$.

3) If $\vec{a}, \vec{b}, \vec{c}$ and $\vec{a}', \vec{b}', \vec{c}'$ are reciprocal system of vectors prove that $\vec{a}'(\vec{a} + \vec{b}) + \vec{b}'(\vec{b} + \vec{c}) + \vec{c}'(\vec{c} + \vec{a}) = 3$.

4) Find the distance between the points A = (– 2, 3, 5), B = (1, 2, 3).

5) Find the co-ordinates of the point that divides the line joining the points (2, – 3, 1) and (3, 4, – 5) in the ratio 1 : 3.

6) A line makes angle of 45° and 60° with the positive axis of x and y respectively. What angle does it make with positive axis of z ?

7) Find the area of the triangle whose vertices are (6, – 1, 6), (6, – 4, 9), (10, 0, 7).

8) Find the angle between the planes $6x - 3y - 2z - 7 = 0$ and $x + 2y + 2z + 9 = 0$.

9) Find the length of perpendicular from (1, 3, 4) to the plane $2x - y + z + 3 = 0$.

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10) Find the equation of the plane passing through the points (0, 1, 1), (1, 1, 2) and (– 1, 2, – 2).

11) Find the equation of the plane bisecting the angle between the planes $3x - 4y + 5z - 3 = 0$ and $5x + 3y - 4z - 9 = 0$.

12) Show that the line $\frac{x-1}{1} = \frac{y+1}{-1} = \frac{z-3}{1}$ and $\frac{x-2}{2} = \frac{y-4}{1} = \frac{z-6}{3}$ are coplanar.

SECTION – B

II. Answer **any two** of the following : **(2×5=10)**

13) Show that $i \times (\vec{a} \times i) + j \times (\vec{a} \times j) + k \times (\vec{a} \times k) = 2\vec{a}$.

14) If $\vec{a}, \vec{b}, \vec{c}$ are any three vectors, then prove that

$$\vec{a} \times (\vec{b} \times \vec{c}) = (\vec{a} \cdot \vec{c})\,\vec{b} - (\vec{a} \cdot \vec{b})\,\vec{c}.$$

15) If $\vec{a} = i + 2j - 2k$, $\vec{b} = -i + 2j + k$, $\vec{c} = i - 2j + 2k$, find $\left(\vec{a} \times \vec{b}\right) \times \vec{c}$ and $\vec{a} \times \left(\vec{b} \times \vec{c}\right)$.

16) If $\vec{a}, \vec{b}, \vec{c}$ and $\vec{a}', \vec{b}', \vec{c}'$ are reciprocal system of vectors, then show that

$$\sum \left(\vec{a}' \times \vec{b}'\right) = \frac{\vec{a} + \vec{b} + \vec{c}}{\left[\vec{a}\,\vec{b}\,\vec{c}\right]} \text{ where } \left[\vec{a}\,\vec{b}\,\vec{c}\right] \neq 0.$$

SECTION – C

III. Answer **any three** of the following : **(3×5=15)**

17) Find the direction cosines of two lines which are connected by the relation $l - 5m + 3n = 0$ and $7l^2 + 5m^2 - 3n^2 = 0$.

18) Show that the acute angle between two lines whose direction cosines are given by the relations $l + m + n = 0$ and $2lm + 2nl - mn = 0$ is 60°.

19) Find the value of 'a' such that the points A(3, 2, 1), B(4, a, 5), C(4, 2, – 2) and D(6, 5, – 1) are coplanar.

20) Find the volume of the tetrahedron ABCD, where A = (1, 0, – 1), B = (2, 1, – 1), C = (1, 0, 2) and D = (2, 1, 0).

21) Find the equation of the plane passing through the points A(1, 1, 1) and perpendicular to the planes $\vec{r}\cdot(1,-3,5)+1=0$ and $\vec{r}\cdot(3,-1,7)=3$.

SECTION – D

IV. Answer **any three** of the following : **(3×5=15)**

22) Find the symmetrical form of the lines of intersection of the planes, 2x + 3y + 5z – 1 = 0 = 3x + y – z + 2.

23) Find the angle between the line $\frac{x-3}{2}=\frac{y+1}{-1}=\frac{z+4}{3}$ and the plane 2x + 3y – z – 4 = 0.

24) Find the equation of the plane containing the line $\frac{x+2}{1}=\frac{y-3}{2}=\frac{z+4}{-3}$ and passing through the point (1, 3, 2).

25) Show that the lines 3x – y – z – 16 = 0 = 2x – 3y – 2z – 19 and 2x + 4y + z + 12 = 0 = x – 2y – z – 13 are coplanar.

26) Find the shortest distance between the lines $\frac{x-3}{1}=\frac{y-4}{-2}=\frac{z+2}{-1}$ and 3x – y – 10 = 0 = 2x – z – 4.

27323(New)

B.Sc. III Semester Degree Examination, March/April - 2021

MATHEMATICS-III

Paper : 3

(New)

Time : 3 Hours **Maximum Marks : 80**

Instructions to Candidates:

1) **PART - A** All questions are compulsory.
2) **PART - B** Solve any **Five** questions from **Seven** questions.
3) Write the question number correctly.

PART - A

I. Answer the following questions. **(10×2=20)**

1) Define Infimum and Suprimum of the sequence.
2) State P - Series.
3) State Raabe's Test.
4) Discuss the convergence of the series $\frac{1}{1.2.3}+\frac{3}{2.3.4}+\frac{5}{3.4.5}+.........$.
5) Test the convergence of $\sum\frac{1}{\sqrt{n}}\tan\frac{1}{n}$.
6) Find the angle between the radius vector and the tangent for the curve $r=a(1-\cos\theta)$.
7) For the curve $r=a\theta$ show that $p=\frac{r^2}{\sqrt{r^2+a^2}}$.
8) Find the ratio of the Polar subnormal to the polar subtangent for the curve $r=ae^{b\theta^2}$.

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9) Evaluate $\int_0^{\frac{\pi}{4}} \tan^n x dx$.

10) Evaluate $\int_0^{\frac{\pi}{2}} \sin^3 x \cos^4 x dx$.

PART - B

(5×12=6

Answer any **Five** complete questions.

II. 11) State and prove De - Alembert's ratio test.

12) Examine the convergence of the series $1+\frac{1}{2}+\frac{1.3}{2.4}+\frac{1.3.5}{2.4.6}+$.......... Raabes test.

III. 13) State Cauchy's root test and hence test the convergence of the seri

$$\sum\left(\frac{nx}{n+1}\right)^n$$

14) Sum the series by C+ is method $\cos\alpha+\cos(\alpha+2\beta)+$.......... + to n ter

IV. 15) Show that the following pair of curves intersect orthogonally $r=a\theta, r=\frac{a}{\theta}$

16) For the curve cardiod $r=a(1+\cos\theta)$ Show that $2ap^2=r^3$.

V. 17) Derive the length of the perpendicular from the pole to the tangent at a po to the curve.

18) (i) Find the pedal equation of the curve $r=ae^{\theta\cot\alpha}$

(ii) Find the angle between the radius vector and the tangent for the curv

$r^2=a^2\cos 2\theta$ at $\theta=\frac{\pi}{6}$

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VI. 19) Show that the curve $r^2 = a^2 \sec 2\theta$ the length of the perpendicular from the pole to the tangent $a\sqrt{\cos 2\theta}$.

20) Show that the angle between the normal at any point (r,θ) on the curve $r^n = a^n \cos n\theta$, and the initial line is $(n+1)\theta$.

VII. 21) Find the reduction formula for $\int \sec^n x dx$.

22) Evaluate (i) $\int_0^1 x^{3/2}\sqrt{(1-x)^3}\,dx$

(ii) $\int_0^\infty \frac{x}{\left(4+x^2\right)^{3/2}}dx$

VIII.23) Evaluate (i) $\int_0^\pi x\sin^7 x\cos^2 x\,dx$

(ii) $\int_0^{\pi/4} \tan^4 x\,dx = \frac{3\pi-8}{12}$

24) Compute the definite integral $\int_0^1 \frac{x^\alpha - 1}{\log x}dx$, where '$\alpha$' is a parameter using Leibnitz's rule of differentiation under integral sign.

11323(Old)

B.Sc. III Semester Degree Examination, March/April - 2021

MATHEMATICS

Vector Algebra and Solid Geometry

Paper - 3.1

(Old)

Time : 3 Hours **Maximum Marks : 60**

Instructions to Candidates:

1. Answer **all** Sections.
2. Write the question number Correctly.

SECTION - A

I. Answer any Ten of the following : **(10×2=20)**

1) Define collinear and coplanar vectors.

2) Show that $i\times(j\times k)+j\times(k\times i)+k\times(i\times j)=0$

3) Find the unit vector coplanar with $\vec{b}$ and $\vec{c}$ and perpendicular to $\vec{a}$ where $\vec{a}$ = 2i + j - k, $\vec{b}$ = i - 2j +2k and $\vec{c}$ = 3i - j + 2k.

4) Show that three points $(-2,3.5),(1,2,3)\, and\, (7,0,-1)$ are collinear.

5) Find the ratio in which the point $(5,4,-6)$ divides the line Joining the points $(3,2,-4)\, and\, (9,8,-10)$

6) If α, β, γ are the angle made by a line with the co-ordinates axes. Show that $\cos 2\alpha+\cos 2\beta+\cos 2\gamma+1=0$.

7) Using the direction ratio show that the lines AB and CD are parallel, where A = (1, 2, 3), B = (4, -3, 6), C = (-1, 2, -2) and D = (2, -3, 1).

8) Find the angle between the planes $6x-3y-2z-7=0\ and\ x+2y+2z+9=0$.

9) Find the equation of the plane passing through the points $(0,1,1),(1,1,2)\, and\, (-1,2,-2)$.

[P.T.O.

10) Find the equation of the line passing through the point $A(1,-1,1)$ and parallel to the vector i - j + k.

11) Find the angle between the plane $x-3y+2z-7=0$ and the line $x-2y+3z+1=0=3x+y+2z+2$.

12) Show that the lines are coplanar $\frac{x-1}{1}=\frac{y+1}{-1}=\frac{z-3}{1}$ and $\frac{x-2}{2}=\frac{y-4}{1}=\frac{z-6}{3}$.

SECTION - B

II. Answer any Two of the following : (2×5=10)

13) Find the unit vector co-planar with $\vec{a}$ and $\vec{b}$ but perpendicular to $\vec{c}$, where $\vec{a}$ = i +j -2k, $\vec{b}$ = -i +2j +k and $\vec{c}$ = i -2j +2k.

14) Show that $i\times(\vec{a}\times i)+j\times(\vec{a}\times j)+k\times(\vec{a}\times k)=2\vec{a}$

15) Find a set of vectors reciprocal to the set of vectors $\vec{a}=2\hat{i}+3\hat{j}-\hat{k}, \vec{b}=3\hat{i}-\hat{j}+\hat{k}$.

16) If $\vec{a}$, $\vec{b}$, $\vec{c}$ and $\vec{a}'$, $\vec{b}'$, $\vec{c}'$ are reciprocal system of vectors then show that :

i) $\vec{a}.\vec{a}'+\vec{b}.\vec{b}'+\vec{c}.\vec{c}'=3$

ii) $\vec{a}'\times\vec{b}'+\vec{b}'\times\vec{c}'+\vec{c}'\times\vec{a}'=\frac{\vec{a}+\vec{b}+\vec{c}}{[\vec{a}\,\vec{b}\,\vec{c}]};(\vec{a},\vec{b}\,\vec{c})\neq 0$

SECTION - C

III. Answer any Three of the following : (3×5=15)

17) Find the direction cosines of the two lines which are connected by the relation $l-5m+3n=0$ and $7l^2+5m^2-3n^2=0$.

18) Find the angle between the two lines whose direction cosines satisfy the equation $l+m+n=0$ and $2l+2m-nm=0$

19) Find the volume of the tetrahedron ABCD, where $A(1,0,-1), B(2,1,-1) C(1,0,2)$ *and* $D(2,1,0)$.

20) Find the equation of the plane passing through the point $A(1,1,1)$ and perpendicular to the planes $\vec{r}.(1,-3,5)+1=0$ *and* $\vec{r}.(3,-1,7)=3$

21) Find the angle between the diagonals of a cube.

SECTION - D

IV. Answer any Three of the following : (3×5=15)

22) Show that the points $(0,-1,0)(2,1,-1)(1,1,1)$ *and* $(3,3,0)$ are coplanar. Find the equation of the plane passing through the points.

23) Find the symmetrical form of the lines of intersection of the planes
$2x+3y+5z-1=0$
$3x+y-z+2=0$

24) Find the equation of the plane containing the line $\frac{x+2}{1}=\frac{y-3}{2}=\frac{z+4}{-3}$ and passing through the point (1, 3, 2).

25) Derive the condition for a line to lie on a plane both in vector and cartesian form.

26) Find the shortest distance between the lines $\frac{x-3}{1}=\frac{y-4}{-2}=\frac{z+2}{-1}$ and
$3x-y-10=0$
$2x-z-4=0$

Dept Time table

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Internals

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Dept Events (webinar/seminar/symposium)

Calendar of Events

Staff profile

27323

B.Sc. III Semester Degree Examination, Oct./Nov. - 2019

MATHEMATICS

MATHEMATICS-III

PAPER-3

Time : 3 Hours

Maximum Marks :80

Instructions to Candidates:

1) Part-A : **All** questions are compulsory.

2) Part-B : Solve any **Five** questions from **seven** questions.

3) Write the **question** number correctly.

PART - A

I. Answer the following questions. (10×2=20)

1. Define convergence and divergence of a sequence.

2. Test the convergence of the series $\sum \frac{1}{\sqrt{n}} \tan\frac{1}{n}$

3. State Raabe's Test.

4. If the series $\sum u_n$ is convergent then prove that $\lim_{n\to\infty} u_n = 0$

5. Examine the following series for convergence

$$\frac{1}{\sqrt{1}+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\text{-------}$$

6. Find the angle between the radius vector and the tangent for the curve $r=a(1+\sin\theta)$ *at* $\theta=\pi/6$.

7. For the curve $r=a\theta$, show that $p=\frac{r^2}{\sqrt{r^2+a^2}}$.

8. Find the ratio of the polar sub normal to the polar subtangent for the curve $r=ae^{b\theta^2}$

9. Define reduction formula of the integral and Evaluate $\int_0^{\pi} x\sin^8 x\,dx$.

10. Find the value of $\int_0^{\pi/2} \tan^5 x\,dx$

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PART - B

Answer any Five complete questions. (5×12=60)

II. 11. State and prove limit form of comparision test.

12. Discuss the convergence of the following series $\frac{1}{1.2.3}+\frac{3}{2.3.4}+\frac{5}{3.4.5}+------$

III. 13. Examine the convergence of the series $\frac{2!}{3}+\frac{3!}{3^2}+\frac{4!}{3^3}+------$ by D' Alembert ratio test.

14. Sum the series (by C+iS method) $\sin\alpha+\sin(\alpha+\beta)+\sin(\alpha+2\beta)+------$ to n terms

IV. 15. Find the angle of intersection of each of the following pairs of curves $r=(\sin\theta+\cos\theta), r=2\sin\theta$

16. Show that the following pair of curves intersect orthogonally $r=a(1+\sin\theta), r=b(1-\sin\theta)$.

V. 17. Derive the length of the perpendicular from the pole to the tangent at a point to the curve.

18. For the curve cardiod $r=a(1-\cos\theta)$ show that $2ap^2=r^3$

VI. 19. Find the pedal equation of the following curve $a^2=r^2\cos 2\theta$

20. Show that the angle between the normal at any point (r,θ) on the curve $r^n=a^n\cos n\theta$, and the initial line is $(n+1)\theta$

VII. 21. Find the reduction formula for $\int\sec^n x\,dx$

22. Evaluate :

i) $\int_0^4 x^3\sqrt{4x-x^2}\,dx$

ii) $\int_0^1 x^4(1-x)^{3/2}\,dx$.

VIII.23. Show that

i) $\int_0^\pi \frac{Sin^4\theta}{1+\cos\theta^2}d\theta=\frac{3\pi}{4}$.

ii) $\int_0^{\pi/4} Sin^4 x.\cos^2 2dx=\pi/32$.

24. Compute the definite integral $\int_0^1\frac{x^\alpha-1}{\log x}dx$, Where '$\alpha$' is a parameter. use leibnitz's rule differentiation under integral sign

31328

(NEP)

B.Sc. III Semester Degree Examination, February/March - 2023

MATHEMATICS

Ordinary Differential Equations and Real Analysis - I

Time : 3 Hours

Maximum Marks : 60

Instructions to Candidates :

1. Part : A - **All** questions are compulsory.
2. Part : B - Answer any **five** full questions.

PART-A

I. Answer the following questions. (5×2=10)

a. Solve $(4x+3y+1)dx+(3x+2y+1)dy=0$.

b. Solve $(p-xy)(p-x^2)(p-y^2)=0$.

c. Evaluate $\frac{1}{D^2+a^2}\cos ax$.

d. Discuss the convergence of the sequence $\cos^2 n\pi$.

e. Define convergent and divergent of the series.

PART - B

Answer any **five** full questions. (5×10=50)

II. a. Solve $\left(\sin x\cos y+e^{2x}\right)dx+(\cos x\sin y+\tan y)dy=0$.

b. Solve $x^2p^2+xyp-2y^2=0$.

III. a. Solve $x^2ydx-(x^3+y^3)dy=0$.

b. Solve $y=x+2\tan^{-1}P$.

IV. a. Solve $4\frac{d^2y}{dx^2}+4\frac{dy}{dx}-3y=e^{2x}$.

b. Solve by method of variation of parameter $\frac{d^2y}{dx^2}+y=\sec x$.

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V. a. Solve $\left(D^2+3D+2\right)y=e^{2x}\sin x$.

b. Verify the condition for integrability $zdx+zdy+[2(x+y)+\sin z]dz=0$.

VI. a. Prove that the sequence $\left\{\frac{2n+7}{3n+2}\right\}$.

i. is monotonically increasing.

ii. is bounded.

iii. Tends to limit 2/3.

b. Discuss the convergence of the following sequence.

i. $1+\frac{1}{3}+\frac{1}{3^2}+.....+\frac{1}{3^n}$.

ii. $\frac{n}{n^2+1}$.

VII. a. Find the limit of the sequence 0.7,0.77,0.777,..........

b. State and prove D'Alembert's ratio test.

VIII. a. Discuss the convergence of the series $\frac{x}{2\sqrt{1}}+\frac{x^3}{3\sqrt{2}}+\frac{x^5}{4\sqrt{3}}+.....\infty$.

b. Discuss the convergence of the series

i. $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+.....+0\infty$.

ii. Prove that every absolutely convergent series is convergent.